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Mobile Subscriber Equipment: The Materiel Fielding
of a Nondevelopmental System

by

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Mobile Subscriber Equipment (MSE) is a tactical communications system which provides mobile field radio, telephone, and record traffic for the U.S. Army at corps and division levels. This system went from contract award to materiel fielding in a period of less than two and a half years through the utilization of nondevelopmental item (NDI) acquisition. The accelerated acquisition cycle presented many challenges to the successful deployment of this tactical communications system. This thesis examines the nontraditional methods of materiel fielding which were employed to address the challenges posed by the NDI acquisition of MSE. These nontraditional methods include contractor total package fielding, contractor developed and implemented training, and contractor logistic support. This thesis identifies the implications of these methods as a source of information for those elements of the acquisition community involved in materiel fielding planning. A significant lesson learned is that contractor total package fielding, training, and logistic support are viable alternatives for accomplishing materiel fielding for NDI systems.

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ABSTRACT

Mobile Subscriber Equipment (MSE) is a tactical communications system which provides mobile field radio, telephone, and record traffic for the U.S. Army at corps and division levels. This system went from contract award to materiel fielding in a period of less than two and a half years through the utilization of nondevelopmental item (NDI) acquisition. The accelerated acquisition cycle presented many challenges to the successful deployment of this tactical communications system. This thesis examines the nontraditional methods of materiel fielding which were employed to address the challenges posed by the NDI acquisition of MSE. These nontraditional methods include contractor total package fielding, contractor developed and implemented training, and contractor logistic support. This thesis identifies the implications of these methods as a source of information for those elements of the acquisition community involved in materiel fielding planning. A significant lesson learned is that contractor total package fielding, training, and logistic support are viable alternatives for accomplishing materiel fielding for NDI systems.

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TABLE OF CONTENTS

I. INTRODUCTION 1

A. FOCUS OF STUDY 1

B. BACKGROUND 1

C. OBJECTIVES AND CONTRIBUTION 2

D. RESEARCH QUESTIONS 2

E. RESEARCH METHODOLOGY 3

F. SCOPE OF STUDY 4

G. ORGANIZATION 4

II. DEFENSE SYSTEMS ACQUISITION 6

A. INTRODUCTION 6

B. THE DEPARTMENT OF DEFENSE ACQUISITION PROCESS 6

C. ACQUISITION MILESTONES AND PHASES 8

D. ACQUISITION STRATEGY 11

E. NONDEVELOPMENTAL ITEM ACQUISITION 12

F. BENEFITS OF NONDEVELOPMENTAL ITEMS 13

G. CHALLENGES OF NONDEVELOPMENTAL ITEMS 15

H. CHAPTER SUMMARY 16

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III MATERIEL FIELDING . . . 18

A. INTRODUCTION . . . 18

B. MATERIEL FIELDING POLICIES . . . 19

C. TOTAL PACKAGE FIELDING . . . 20

D. NEW EQUIPMENT TRAINING . . . 22

E. LOGISTICS SUPPORT . . . 24

F. FIELDING NONDEVELOPMENTAL ITEMS . . . 26

G. CHAPTER SUMMARY . . . 27

IV. MOBILE SUBSCRIBER EQUIPMENT . . . 29

A. INTRODUCTION . . . 29

B. SYSTEM DESCRIPTION . . . 29

C. ACQUISITION HISTORY . . . 30

D. ACQUISITION STRATEGY . . . 31

E. CONTRACTS . . . 32

F. CHAPTER SUMMARY . . . 34

V. MOBILE SUBSCRIBER EQUIPMENT MATERIEL FIELDING . . . 35

A. INTRODUCTION . . . 35

B. MATERIEL FIELDING CONCEPT . . . 35

C. TOTAL PACKAGE FIELDING . . . 36

D. NEW EQUIPMENT TRAINING . . . 40

1. Individual Training 40
2. Network Training 41
3. Collective Training 41
E. LOGISTICS SUPPORT 43
1. Maintenance 44
2. Supply Support 45
F. CHAPTER SUMMARY 48

VI. SUMMARY AND LESSONS LEARNED 50
A. SUMMARY 50
B. LESSONS LEARNED 51
C. RECOMMENDATIONS FOR FURTHER STUDY 53

APPENDIX A LIST OF ACRONYMS 55

LIST OF REFERENCES 57

INITIAL DISTRIBUTION LIST 60

I. INTRODUCTION

A. FOCUS OF STUDY

Materiel fielding is the process of planning, coordinating, and executing the deployment of a materiel system and its support. [Ref. 1: p. 7] It is a critical step in the acquisition process, requiring extensive planning early in the development phases of a program.

The materiel fielding of Mobile Subscriber Equipment (MSE) began in February 1988, less than two and a half years after the production contract was awarded. The speed with which MSE went from the drawing board to the field was possible through the use of a nondevelopmental item (NDI) acquisition approach. The NDI acquisition of MSE offered a quick response to user's needs but it also presented many challenges. To meet these challenges, nontraditional methods were implemented to ensure the orderly and effective deployment and transfer of MSE equipment. These nontraditional methods that supported the fielding of MSE are the focus of this study. These methods may provide alternatives for other programs to use in the fielding of future nondevelopmental systems.

B. BACKGROUND

MSE is a mobile radiotelephone communication system which provides secure voice, high-volume data, and facsimile transmission to both mobile and stationary users in the U.S. Army division and corps areas of operation.

The acquisition of MSE was a massive and comprehensive force modernization effort. All U.S. Army Reserve and Army National Guard units received MSE coincident with active component fieldings. The MSE contract provided system equipment for 24 divisions, four corps, two Training and Doctrine Command (TRADOC) schools, and two test sites. [Ref. 2: p. 2]

The NDI procurement contracts for MSE integrated the requirements for total package fielding, training, and logistics support. Responsibilities of the primary contractor included delivery of the MSE system as well as the trucks, generators, tools, and manuals required for system operation. The primary contractor was also responsible for providing system handoff, user training, spare support, and maintenance support services.

C. OBJECTIVES AND CONTRIBUTION

The objectives of this study are to identify challenges associated with the materiel fielding of NDI systems as a result of the accelerated acquisition process, and to examine the nontraditional methods used in the MSE program to address these challenges. This study will provide a source of information for those elements of the acquisition community involved in materiel fielding planning. The strengths and weaknesses of the nontraditional methods will provide lessons learned for future NDI fielding programs.

D. RESEARCH QUESTIONS

In order to accomplish the above objectives, the research focuses on the following question: What challenges does an NDI acquisition strategy present for the materiel

fielding process and how were those challenges addressed for the materiel fielding of MSE? Subsidiary research questions are:

1. What is the Department of Defense (DoD) acquisition process and how does NDI acquisition affect that process?

2. What are the Department of the Army policies and responsibilities for materiel fielding and how are the activities associated with materiel fielding affected by NDI acquisition?

3. What were the nontraditional methods used to meet the challenges associated with NDI fielding of MSE, and what were the strengths and weaknesses of those methods?

4. What are the lessons learned from the materiel fielding of MSE?

E. RESEARCH METHODOLOGY

Research was conducted in two phases. The first phase included a comprehensive review of The DoD major systems acquisition process and the acquisition of NDI systems as a function of that process. This examination identified challenges associated with the acquisition and fielding of NDI systems. Primary sources of information included current acquisition directives and instructions, and Army regulations and instructions for materiel fielding. Additional sources included Defense Systems Management College publications. Information on the materiel fielding of NDI systems was gathered through interviews with personnel from Army commands responsible for providing support services to program managers. These commands included the Communications/Electronics Command (CECOM) and Missile Command (MICOM).

The second phase involved an examination of the MSE acquisition program. The challenges associated with fielding NDI systems were analyzed with respect to the methods used to accomplish the materiel fielding of the MSE system. Sources of information included MSE fielding documentation, After Action Reports, and Unit Status Reports from fielded units. Additional information was acquired through interviews with personnel from the MSE Project Office, MSE Materiel Fielding Team, and the GTE MSE program office.

F. SCOPE OF STUDY

This study analyzes the materiel fielding of MSE to active Army signal units. Further, this study focuses on the nontraditional fielding methods which were employed to address the challenges posed by NDI acquisition. These nontraditional practices are contractor total package fielding, a contractor developed and executed training program, and contractor maintenance and supply support. While the fielding methods will be examined to show how they provide potential solutions to problems associated with NDI acquisition, this study will not provide a rigorous analysis of the effectiveness of these practices. The data required for such an analysis are not available as MSE materiel fielding recently concluded in November 1993.

G. ORGANIZATION

This thesis is divided into six chapters. Chapter I is the introduction and describes the purpose of this thesis. Chapter II introduces defense systems acquisition and discusses the challenges and benefits associated with NDI acquisition. Chapter III describes the

materiel fielding process and provides the reader an understanding of the challenges associated with fielding NDI systems. Chapter IV outlines the development of the MSE acquisition strategy and discusses equipment and support contracts. Chapter V presents the materiel fielding concept and discusses the conduct of MSE materiel fielding. This information forms the basis for the analysis of the nontraditional fielding elements. Chapter VI provides a summary, lessons learned, and recommendations for further study.

II. DEFENSE SYSTEMS ACQUISITION

A. INTRODUCTION

This chapter provides a description of the major system acquisition process as it applies to DoD. This chapter also introduces the reader to NDI acquisition and describes the benefits and challenges associated with an NDI acquisition strategy. This material provides the framework needed to understand the specific challenges associated with fielding the MSE system.

B. THE DEPARTMENT OF DEFENSE ACQUISITION PROCESS

The DoD acquisition process develops, produces, supplies, and supports weapons systems to achieve the operational goals of the Armed Services. The acquisition process enables the military to keep pace with the threat, increase capabilities, and correct deficiencies.

Office of Management and Budget (OMB) Circular A-109, titled "Major System Acquisition," provides policy and guidance for the acquisition of major systems for federal agencies, including DoD. The policies established by OMB Circular A-109 are intended to ensure the effectiveness and efficiency of the major system acquisition process. Guidance for implementation of this policy is provided in DoD Directive (DoDD) 5000.1, "Defense Acquisition" and DoD Instruction (DoDI) 5000.2, "Defense

Acquisition Management Policies and Procedures." Army Regulation AR 70-1, "Army Acquisition Policy," implements the DoD directives.

An acquisition program can begin in a number of different ways. For example:

1. A program can begin as a replacement for an existing system that has become obsolete.
2. A new threat is identified which requires a new system design to counter that threat.
3. A DoD mission change can establish the requirement for new equipment.
4. A new technology is identified which can be inserted into existing programs or sparks the development of new systems.

Agencies conduct mission area analyses to identify and define mission needs, to identify new technological opportunities, and to determine whether a new major acquisition program is required. For major programs, the Secretary of Defense makes the determination as to whether or not to initiate a program and to begin a search for alternate systems concepts to meet the mission need.

The search for alternate systems concepts begins with an examination of nonmateriel solutions to support the mission need. Nonmateriel solutions include changes in doctrine, operational concepts, tactics, training, or organization. [Ref. 3: p. 17-15] If a nonmateriel solution will not satisfactorily address the deficiency, then a materiel solution is investigated. The system's requirements are generated and validated, then the developing or procurement commands are tasked to identify how they can best meet the requirements.

C. ACQUISITION MILESTONES AND PHASES

The acquisition process is a sequence of activities starting from the agency's reconciliation of its mission needs with its capabilities, priorities, and resources, extending through the introduction of a system into operational use or the otherwise successful achievement of program objectives. [Ref. 4: p. 11] The acquisition process model described in DoDI 5000.2 is a sequence of events and phases of program activities and decisions leading to the fielding of fully supportable systems responsive to service requirements. It is structured in discrete phases separated by major decision points or milestones. There are five major milestone decision points and five phases of the acquisition process as shown in Figure 1. This framework provides a basis for comprehensive management and progressive decision making.

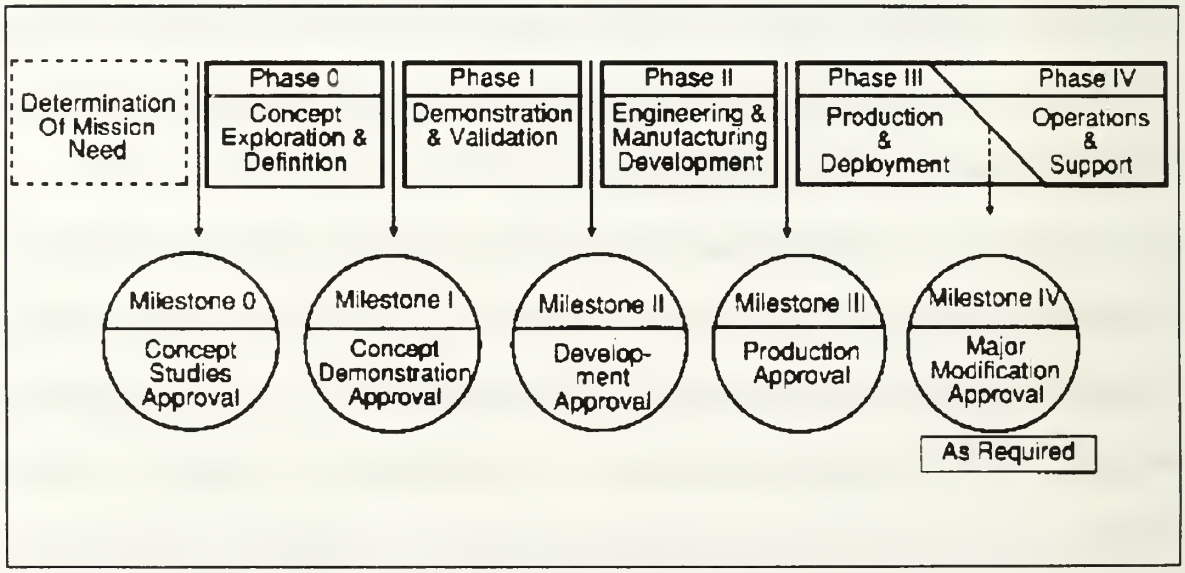

Figure 1. Acquisition Process [Ref. 3: p. 21-35]

Milestone 0, Concept Studies Approval, determines if a documented mission need warrants the initiation to explore alternative concepts. Approval of this milestone begins Phase 0, Concept Exploration and Definition. Studies of alternative materiel concepts are conducted to identify the most promising potential solutions to validated user needs

Milestone I, Concept Demonstration Approval, examines the results of Phase 0 and determines if the results warrant establishing a new acquisition program. Approval for initiation of a new program leads to Phase I, Demonstration and Validation. Phase I defines the critical design characteristics and expected capabilities of the system concept. When warranted, multiple design approaches and parallel technologies are pursued. The technologies critical to the most promising concept are demonstrated.

Milestone II, Development Approval, assesses the affordability of the program and approves the initial acquisition strategy or management concepts used in directing and controlling the acquisition. A Development Baseline is established to identify program cost, schedule, and performance objectives. This milestone approves low rate production if required. At this milestone, Phase II, Engineering and Manufacturing Development begins. Phase II determines the design approach which has the greatest potential to result in a stable, producible, and cost effective system design.

Milestone III, Production Approval, approves the final acquisition strategy and Production Baseline. This decision demonstrates a commitment to build, deploy, and support the system. Phase III, Production and Deployment, begins. Deployment or materiel fielding occurs, placing the operational system in the hands of the user.

Phase IV, Operations and Support, does not require a milestone decision. This phase overlaps Phase III and consists of supporting the fielded system, monitoring system performance, identifying improvement opportunities, and modifying the system as required. The system remains in this phase until system disposal is approved.

Milestone IV, Major Modification Approval, is only used as required. Milestone IV determines if major modifications to a system still in production are warranted.

DoDD 5000.1 requires that a program manager be assigned to major system programs within six months from a favorable decision at Milestone I. [Ref. 5: p. 3-10] The program manager, or materiel developer, assumes responsibility for managing the program during each of the remaining phases of the acquisition process. When discharging his or her responsibilities, the materiel developer must not only ensure that the system meets minimum performance requirements, but also that it is delivered on schedule, in the required quantities, and within approved budget ceilings.

This acquisition model serves to evolve a system from a paper description of a concept to hardware that will go into production and fielding. The acquisition of a defense system normally takes from 8-16 years from identification of a war fighting deficiency to fielding of the system. [Ref. 6: p. viii] During those 8-16 years the program is controlled through the periodic business and technical decisions of the acquisition process. These decisions are scheduled into the overall strategy to acquire the system.

D. ACQUISITION STRATEGY

The acquisition strategy provides the framework for achieving program objectives within resource constraints. This strategy, which covers the entire program, is formulated during Phase 1, Concept Exploration and Definition, and approved at the Milestone I decision. The acquisition strategy is updated and refined in the subsequent acquisition phases, and revalidated at each milestone review. The acquisition strategy defines essential program elements to include the management, technical, resource, procurement and contracting, testing, training, deployment, support, and other aspects critical to the success of the program. The primary goal in developing an acquisition strategy is to minimize the time and cost of satisfying a need consistent with common sense, sound business practices, and the basic policies established by DoDD 5000.1. [Ref. 7: p. 5-A-1]

DoDI 5000.2 allows the materiel developer to modify the acquisition process when it is in the best interests of the program to do so. Modification of the acquisition process is referred to as tailoring and is described in the acquisition strategy. Tailoring the acquisition process seeks to minimize administrative delays and take advantage of cost savings or shortened schedules.

An acquisition strategy can use many approaches, individually or in combination, to meet the particular needs of a program. One example of an approach used in the acquisition strategy is NDI acquisition, which will be explained in detail in the next sections.

E. NONDEVELOPMENTAL ITEM ACQUISITION

Following the guidance of DoDI 5000.2, materiel developers look first at using existing systems which can be employed "as is," or which can be modified to meet requirements. NDI is a broad, generic term that covers material available from a wide variety of sources with little or no development effort required by the Government. [Ref. 4: p. 3] If an existing or modified system can meet stated requirements, the system can be procured using an NDI acquisition strategy. [Ref. 4: p. viii] The NDI acquisition strategy focuses on minimizing the development of a new system or modifying existing components. An NDI system is defined as:

1. Any item available in the commercial marketplace.
2. Any previously developed item in use by a federal, state, or local agency of the U.S. or a foreign government with which the U.S. has a mutual defense cooperation agreement.
3. Any item described in 1 or 2 above that requires only minor modification to meet the requirements of the procuring agency.
4. Any item currently being produced that does not meet the requirements of 1, 2, or 3 above, solely because the item is not yet in use or is not yet available in the commercial marketplace. [Ref. 7: p. 6-L-1]

It is important to note that an NDI acquisition approach usually calls for the use of a tailored version of the standard acquisition process to match the character of the program and allow the most efficient satisfaction of individual program requirements, consistent with the degree of risk involved. [Ref. 7: p. 5-A-4] Tailoring includes

approaches such as overlapping, combining, or omitting phases of the acquisition process. Tailoring the acquisition process through the use of an NDI strategy provides many benefits as well as challenges that the materiel developer must consider.

F. BENEFITS OF NONDEVELOPMENTAL ITEMS

NDI acquisition is a cost effective approach to meet requirements for major systems and support items. NDI acquisition represents an opportunity to eliminate or reduce the cost required for research, development, test, and evaluation functions. Cost reduction can be realized through the competitive pressures of commercial markets. In addition, production start-up costs are avoided, and the government is able to take advantage of economies of scale where the government is not the only buyer. High volume production reduces cost in comparison to the smaller volume production of defense products. These elements can provide a significant reduction in weapons systems cost and enable the government to project funding requirements more accurately because the item is in use and has established costs.

NDI acquisition shortens the acquisition process and provides a quick response to operational needs. Many phases of the acquisition process can be eliminated, or the time to complete these phases can be reduced. NDI systems can be fielded in considerably less time than full development systems as shown in Figure 2. This can be extremely important for programs where the mission need is urgent.

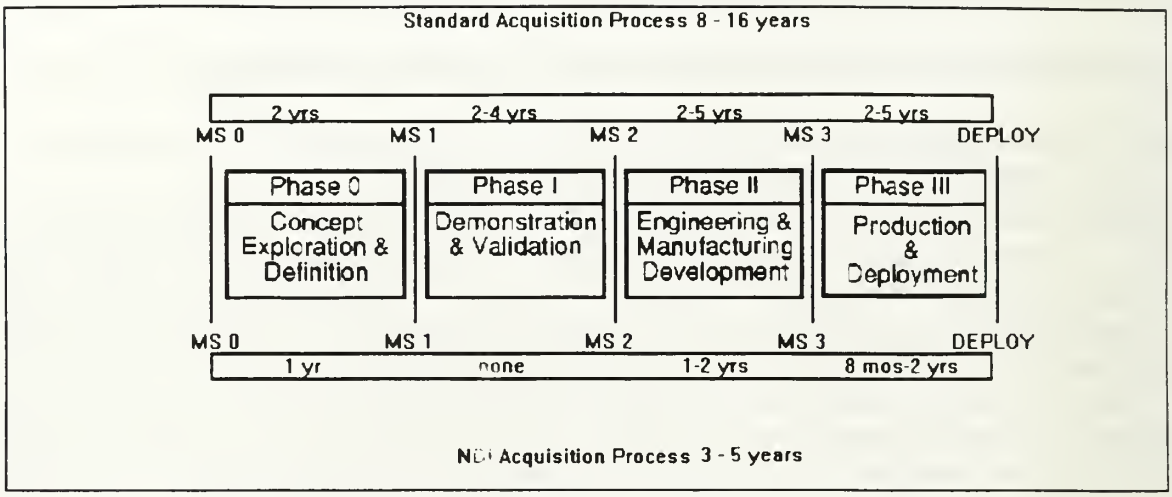

Figure 2. Comparison of Standard and NDI Acquisition Process [Ref. 33: p. 2]

NDI acquisition takes advantage of state-of-the-art technology with little or no risk. Breakthroughs that occur in industry and that are applicable or adaptable to military use can be made available immediately. Risk is reduced through the acquisition of proven products that have been produced using established and validated techniques. The manufacturer has conducted product testing, and there are many customers that can confirm the quality of the product.

NDI procurement allows the services to provide the military forces with the equipment necessary to meet operational requirements as the number of defense contractors is reduced. This benefit becomes more important because as the DoD becomes smaller, maintaining the industrial and mobilization base becomes more critical. The acquisition of NDI systems broadens the defense industrial base, increasing the number of defense contractors available to support a surge capacity.

G. CHALLENGES OF NONDEVELOPMENTAL ITEMS

NDI procurement poses several challenges not associated with full development programs. Mission performance trade-offs may be required to gain the advantages from pursuing an NDI acquisition. Operational suitability and the performance capabilities of an NDI system may require trade-offs since an NDI has been developed for other than DoD needs. NDI alternatives that significantly degrade the performance, logistics supportability, and reliability characteristics of the system should not be considered. An NDI system must meet user's needs and function in the user's environment.

The procurement of an NDI system can reduce commonality and standardization in DoD systems, which increase manpower and support requirements. The proliferation of components or equipment which are not compatible or interchangeable with those of other systems can lead to reduced materiel readiness. The addition of unique logistics procedures developed around the requirements of the NDI system, place additional demands on the end users.

Other sources of challenges are the standard internal DoD support processes which must be expedited or tailored to accommodate an NDI strategy. [Ref. 8: p. 384] These internal DoD support processes include the training development system, the logistics and maintenance activities support system, the personnel management system, and the military force design planning process. These processes of developing organization, equipment, training, and personnel authorizations are complex and time consuming. These processes are normally accomplished over the 8-16 years of the standard acquisition process. With

the accelerated acquisition associated with NDI, the accomplishment of these activities may not keep pace with the availability of the end item.

Integrated logistics support (ILS) activities present significant challenges for an NDI acquisition process. Problems can occur in providing logistics support, product modifications, and continued system availability. The NDI strategy must consider the availability of the system and its support elements throughout the projected life cycle, since the manufacturer may discontinue production and support of the equipment while the item is still in use by DoD. Sustainability problems can arise if repair or replacement items are not available. It may be necessary to consider one-time buys or acquisition of technical data required to reproduce the product. In some cases technical data is not available for purchase or is only available at a substantial cost.

When the acquisition process is accelerated through the procurement of an NDI, timely logistics support is difficult to accomplish. The selection of an NDI reduces the interval between production award and fielding of the system to the user. The time required to prepare, staff, and approve program management documents, manpower estimates, and equipment authorization documents included in the establishment of a logistics support capability is often greater than the time actually required to produce and deploy hardware.

H. CHAPTER SUMMARY

This chapter introduced the reader to the defense systems acquisition process. It also provided a definition of NDI acquisition and described some of the benefits and

challenges associated with an NDI acquisition strategy. This information provides the framework necessary to understand materiel fielding of NDI systems.

III. MATERIEL FIELDING

A. INTRODUCTION

This chapter will provide the reader with an understanding of the fielding process by outlining the policies and activities associated with materiel fielding. Activities critical to successful fielding include total package fielding (TPF), new equipment training (NET), and logistics support. The standard methods used to accomplish these fielding activities are described. Additionally this chapter will further explore the challenges associated with NDI acquisition and specifically how they affect the materiel fielding process.

The materiel fielding process is intended to ensure the orderly and effective deployment and transfer of Army equipment and all necessary logistics support requirements. The elements of the materiel fielding are described in Figure 3.

For the purpose of this thesis, these elements are organized under the fielding activities of TPF, NET, and logistics support. The success of the materiel fielding process is directly related to how well it is planned, coordinated, and executed. [Ref. 9: p.13-9] Properly planned and executed materiel fielding can result in high unit readiness, reduced cost, less logistics turmoil, and can establish a favorable reputation for the new system. [Ref. 18: p. 13-1] Poor materiel fielding creates an adverse affect by forcing the gaining command to redirect previously committed resources and personnel to accomplish the activities necessary to ensure initial support for the system.

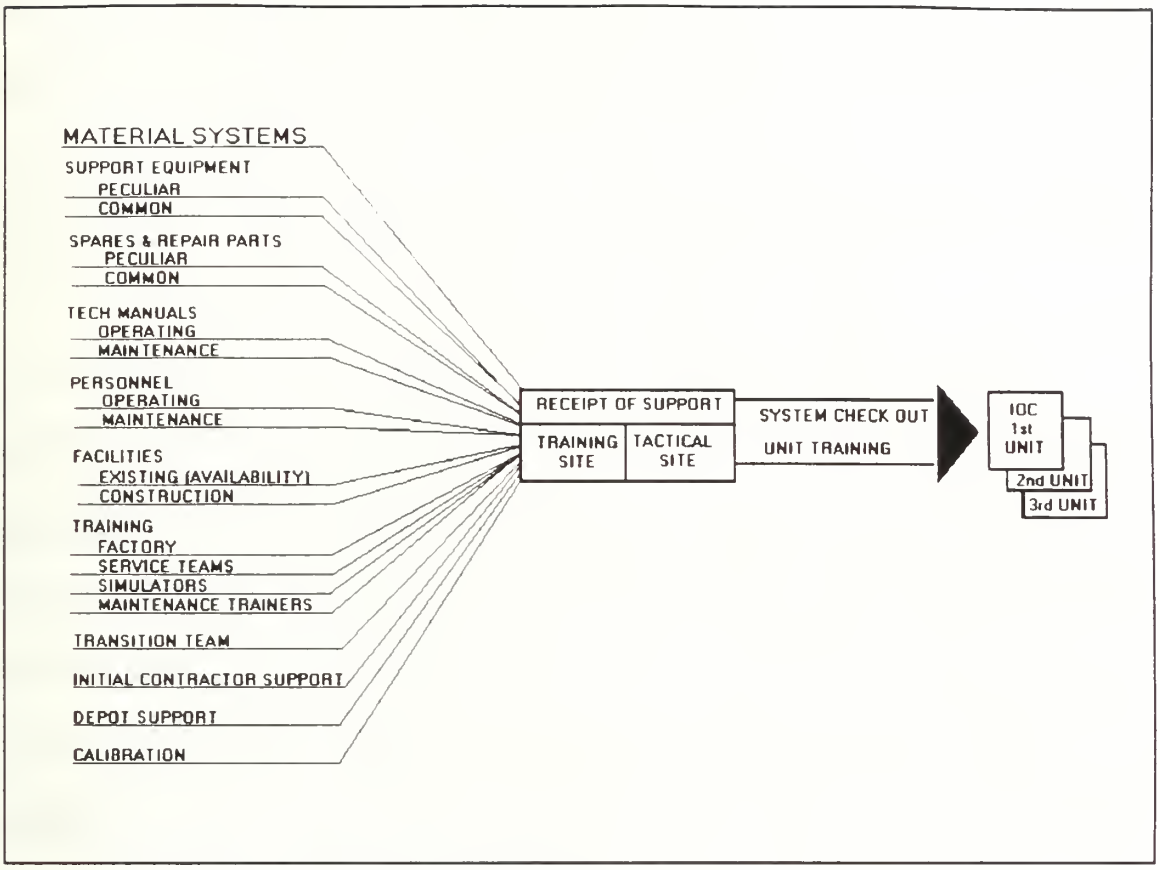

Figure 3. Materiel Fielding Requirements [Ref. 9: p.13-2]

B. MATERIEL FIELDING POLICIES

Department of the Army policies, responsibilities, and administrative procedures for materiel fielding are contained in Army Regulation 700-142, "Materiel Release, Fielding, and Transfer." These regulations are implemented in DA PAM 700-142. This guidance is designed to ensure that materiel is suitable and supportable before release for issue to the gaining command.

The Materiel Fielding Plan (MFP), as outlined in DA PAM 700-142, identifies the total set of actions and events required to manage and execute the initial deployment of new systems. The MFP contains the detailed plans and actions the fielding and gaining commands will accomplish to field the materiel system. The MFP also provides the gaining command an understanding of the requirements including the personnel, skills, and facilities needed to use, maintain, and support the new system.

The MFP is the basis for the Materiel Fielding Agreement (MFA), which is negotiated with each gaining command. Specific responsibilities of both the gaining command and project manager are delineated in the MFA. The MFA acknowledges acceptance of the mutual responsibilities, resource commitments, and documents the gaining command's acceptance of the terms and schedules of the MFP. [Ref. 1: p. 8]

Materiel fielding policies and responsibilities are designed to achieve an orderly and satisfactory deployment of a materiel system and its initial support beginning with the first unit equipped (FUE) and extending until initial operational capability (IOC) is reached. The FUE date is based on having the end item and support concurrently available. IOC is achieved when the unit is fielded with the required quantities of production items, unit personnel are trained to operate and support the item in the field, and the required quantities of repair parts, tools, and test equipment are on hand. [Ref. 10: p. 20]

C. TOTAL PACKAGE FIELDING

The standard fielding method within the Army is TPF. TPF is designed to deploy materiel systems that are fully operational and supportable in the military environment.

[Ref. 10: p. 10] Under TPF, a system and its required support equipment, parts, manuals, and other required materials are consolidated and distributed to the gaining command as a "total package." This procedure eliminates any gap between the time a unit receives a system and the time it receives support equipment. The goal is to place a complete and operationally ready system in the hands of the gaining command, thereby relieving it of the logistics burden associated with materiel fielding.

TPF requires the materiel developer to plan not only for the required quantities of production items, but also for all elements required for system operation. Many major systems have components (e.g., trucks, generators) that are already in the Army inventory. For these components, a procurement system is already in place through the Army's buying commands (e.g., CECOM, MICOM). These components are requested through the buying commands, which prioritize their allocation, in part, according to the Department of the Army Master Priority List (DAMPL). [Ref. 3: p. 18-19] The DAMPL is a rank-ordered list of all Army units based on the "first to fight, first resourced" concept. [Ref. 3: p. 9-14] The priority of allocation enables the buying command to generate an equipment distribution plan for future fieldings. Components of end items are allocated to the materiel developer based on the distribution plan and subsequently provided to the contractor as government furnished equipment (GFE) for integration into the end item or for issued directly to the gaining command. In either case the overall responsibility for TPF rests with the materiel developer. Extensive planning is required to coordinate the activities and schedules with contractors and buying commands to ensure that the total package is available to meet the schedule established for materiel fielding.

D. NEW EQUIPMENT TRAINING

NET is normally conducted by Army agencies and is designed to support the fielding process through the identification of personnel, training, and training devices required to support new systems. [Ref. 3: p. 21-31] Figure 4 depicts the sequence of NET development activities in relation to the acquisition process.

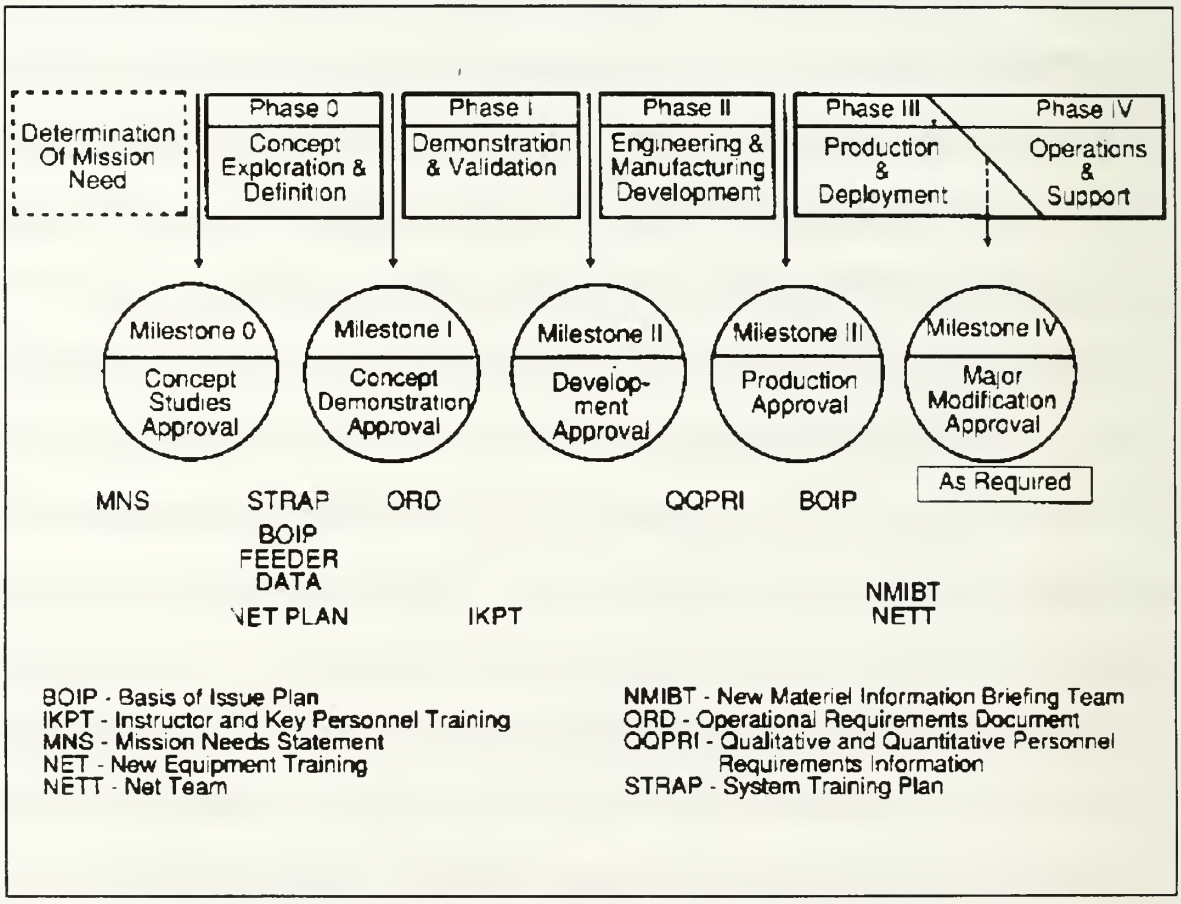

Figure 4. New Equipment Training Development Process [Ref. 3: p. 21-35]

The establishment of NET is an iterative process beginning with the development of the System Training Plan (STRAP). This document, developed by the proponent TRADOC school, is the master training plan which identifies who requires training, what tasks need training, and when, where, and how training will be conducted [Ref. 3: p. 21-33] The materiel developer produces the NET Plan which complements the STRAP by documenting the training requirements and assuring that the resources programmed in support of NET are synchronized with the acquisition process. [Ref. 3: p. 21-32]

The Mission Needs Statement (MNS) and the Operational Requirements Document (ORD) are the program management documents that establish the overall requirements for the system. The BOIP Feeder Data and the BOIP establish the level of equipment authorized for a unit. The Qualitative and Quantitative Personnel Requirements Information (QQPRI) is a compilation of organizational, doctrinal, training, duty position, and personnel information that is used to determine the need to develop or revise military and civilian occupational specialties. [Ref. 3: p. 11-9] Instructor and Key Personnel Training (IKPT) provides the technical knowledge to the personnel required to make up the New Materiel Information Briefing Team (NMIBT) and NET Team (NETT).

The many planning and development tasks that make up NET occur over the 8-16 years of the acquisition process. These tasks are designed to ensure that all necessary courses, training products, and training support, and training personnel with systems operation knowledge are available when the system is fielded.

E. LOGISTICS SUPPORT

Two essential aspects of logistics support are a maintenance capability and supply support capability. Materiel fielding policies require logistics support to be in place at the time when the gaining command receives the equipment. This requires extensive planning by the materiel developer to ensure the proper development of these capabilities.

Maintenance planning establishes the responsibilities, support levels, and repair policies required to maintain a desired level of equipment or system availability. In general there are three levels of maintenance which provide for increasing levels of complexity:

1. Organizational maintenance: This level includes tasks that are performed at the user level and are normally limited to component replacement, preventative maintenance, and simple corrective maintenance.

2. Intermediate maintenance: This level includes tasks that are beyond the organizational capability and usually include removal and replacement of major assemblies or parts. This level can be broken down to Intermediate Direct Support (IDS) and Intermediate General Support (IGS). IDS facilities are usually mobile and located forward in an area of operations. IGS facilities are usually semifixed and deployed in the rear.

3. Depot maintenance: This level includes tasks that usually include restoration, overhaul, or rebuilding of equipment. [Ref. 3: p. 18-9]

Planning is required for all levels of maintenance. Planning includes collecting repair cost data, determining manpower needs, establishing positions, and providing training and equipment. Planning requirements increase as the complexity of repair increases. For example, developing the organizational capability to isolate faults to and

replace components is less complex than the development of the IGS capability to repair piece parts of components. Thus, at higher, more complex levels of maintenance, establishing and approving manpower requirements are more extensive, training requirements are increased, and test equipment is more complex

The requirements for higher levels of technical data also increase as the complexity of repair increases. Technical data for maintenance support include several levels of specifications, technical manuals, and calibration procedures.

Supply support encompasses all actions required to identify and obtain the spares and repair parts needed to support the system throughout its operational life. Supply support requirements are based on the maintenance level where repair is performed. At the organizational level, the prescribed load list (PLL) represents spares and repair parts authorized for replacement at that level. The authorized stockage list (ASL) represents spares and repair parts authorized for repair work and repairable exchange at the IDS and IGS levels in support of the units. Initial issue of PLL/ASL is normally provided by the contractor. Resupply requisitions require the development of a support capability through established supply channels. Long term supply support is provided through a reprocurement capability.

As with the development of a maintenance capability, a supply support reprocurement capability requires technical data. Higher levels of technical data such as technical drawings and documentation define the component for production. These drawings and documentation are used to competitively solicit sources of supply.

F. FIELDING NONDEVELOPMENTAL ITEMS

The information presented in this chapter so far has focused on the fielding activities of the standard acquisition process. The accelerated acquisition process associated with NDI systems leaves less time to accomplish the critical aspects of TPF, NET, and logistics support.

Significant problems can be encountered ensuring TPF for NDI systems because of the accelerated schedule. Component distribution for items already in the Army inventory are not within the direct control of the materiel developer. The existing distribution scheme, as identified in the DAMPL, may not support the fielding schedule. Difficulties may arise as conflicts in priorities are elevated to higher levels of command for resolution. The coordination needed to resolve these issues may cause delays in the fielding schedule. Risk is increased as control over production and delivery of equipment moves further outside the control of the materiel developer.

Increased risk for meeting established schedules is also a factor when components are provided to the contractor as GFE for integration into the end item. When components are provided as GFE, the materiel developer generally assumes the responsibility for on-time delivery, functional performance, reliability, and the technical interface of the GFE with the end item. If GFE is late, the contractor may be forced to slip the end item production schedule, which in turn may affect the contract delivery schedule. Slips in the schedule generally result in increased costs. Additionally, if the delay, caused by problems with GFE, results in increades costs for the contractor, these costs will be passed on to the government. [Ref. 11: p. 47]

The accelerated schedule associated with NDI systems may not support the development of a NET capability. For NDI systems, the time between the identification of equipment and personnel requirements and the fielding of the system is significantly reduced The time required for the development of a NET training capability may exceed the time required to produce and deploy the system.

An NDI acquisition presents logistics support challenges in fielding due to the lack of technical data In many cases the procurement of technical data is limited because of the proprietary nature of this information in the commercial market. Technical data may not be available for purchase or may only be available at a significant cost to the government

Essential logistics support activities are normally accomplished in preproduction phases of the standard acquisition process. The time required to prepare, staff, and approve program management documents, manpower estimates, and equipment authorization documents included in the establishment of a logistics support capability is often greater than the time actually required to produce and deploy hardware for NDI systems. [Ref. 9: p. 17]

G. CHAPTER SUMMARY

This chapter introduced the reader to the policies and activities associated with materiel fielding. The materiel fielding process seeks to ensure that the gaining command receives a materiel system that is operational and supportable in the military environment. An NDI acquisition strategy presents significant challenges for materiel fielding. The

time available to accomplish planning and coordination is greatly reduced, thereby increasing the risk of problems in fielding. The remainder of this thesis will focus on the MSE program and the actions taken to mitigate these challenges.

IV. MOBILE SUBSCRIBER EQUIPMENT

A. INTRODUCTION

This chapter provides the framework and background in which the MSE system was acquired. First, a brief description of the MSE system and outline of the acquisition history will be presented. Second, this chapter will explain the acquisition strategy and contracts for the MSE system. This information provides the necessary background for understanding the materiel fielding of the system.

B. SYSTEM DESCRIPTION

MSE is a tactical communications network which provides voice and data communications support for use at U.S. Army corps and division levels. The system supports the communications requirements for digital radio telephone users, switched system subscribers, information processing facilities, and combat net radio users. MSE uses a flood search technology deployed in a nodal or grid network of communications sites. The communication sites integrate the functions of radio trunking, switching, communications security, and system monitoring. The MSE mission is designed to equip a notional five-division corps covering an area of 37,500 sq. km., roughly the size of Massachusetts, Connecticut, and Rhode Island combined. The network interfaces with U.S. and NATO tactical and strategic communications systems in the current inventory,

with the Tri-Service Tactical Communications (Tri-Tac) network deployed at echelons above corps, and with commercial telephone networks.

C. ACQUISITION HISTORY

For the past twenty years the Army has fielded communications systems under the Tri-Tac concept. Tri-Tac provided communications networks from the brigade level commands up through the corps level to echelons above corps. Interfacing equipment procured early in the Tri-Tac program with newer assemblages became extremely challenging. The corps level communications system was a conglomeration of many different types of assemblages which were difficult to install and not responsive to the needs of the modern combat commander. [Ref. 12: p. 287] The Army needed smaller, lighter weight, and more mobile communications electronics equipment for the tactical forces. [Ref. 13: p. 17]

Emerging doctrine, escalating costs, and delays in fielding Tri-Tac systems forced a restructuring of communication requirements that resulted in a separate procurement strategy for communications at corps level and below. In 1983, a Battlefield Communication Review reported that highly mobile communications were necessary to support the modern battlefield and that the current communications could not move at the same pace as the units supported. [Ref. 14: p. 1] The primary concern was to provide battlefield communications that responded to the mandated requirement of the Army's AirLand Battle doctrine. [Ref. 15: p. 1] Army planners revised the communications concept to require a complete mobile radiotelephone system to supplant Tri-Tac

equipment and be deployed throughout the corps and division areas of the Army [Ref. 16: p. 6]

D. ACQUISITION STRATEGY

The urgent need for a new communication system combined with fact that the necessary technology already existed in world-wide commercial markets led the Army to an NDI acquisition strategy for procurement of the network. [Ref. 17: p. 14] The NDI approach attempted to achieve the goal of expediting the fielding of the MSE system while satisfying the operational needs of the Army. It was recognized that the NDI approach would not meet all the desired requirements. The Army was prepared to accept mission performance trade-offs to gain the cost and schedule advantages of an NDI approach. [Ref. 18: p. 2]

In order to achieve the operational needs of the Army, the acquisition strategy emphasized the use of performance capabilities rather than detailed directions and restrictive specifications. The performance capabilities identified five functional areas: subscriber terminals, mobile subscriber access, wire subscriber access, area coverage, and system control. This is a significant element of acquisition strategy enabling MSE to be procured in terms of form, fit, and function taking advantage of technology available on the commercial market.

The acquisition strategy required the offerors to demonstrate the proposed system in its final configuration. This approach ensured a developed system which would support

an early assessment of safety and environmental deficiencies and potential modifications required.

The acquisition strategy for MSE recognized that MSE had to be fully deployed before Army units could fully interoperate. As a result the acquisition strategy required the procurement of the total system. The total communications system included both the division and corps common communications assemblages. Equipment was acquired simultaneously for both active and reserve components. Previous acquisitions had modernized only one component or piece of the Army's tactical communications system. This previous method of "piecemeal" modernization led to numerous technical problems in signal units. [Ref. 19: p. 12] The MSE NDI approach ensured an integrated system and mitigated commonality and standardization problems common to the purchase of NDI systems.

The NDI acquisition strategy sought to capitalize on the use of supply, maintenance support, and documentation which had already been developed by and were available from the contractor. The use of existing supply and maintenance support provided alternatives to the development of these elements through internal DoD support processes.

E. CONTRACTS

A Request for Proposal (RFP) was issued in July 1984. The RFP outlined five functional capabilities, mandatory priced options, and desired features. It was clearly stated that the government wanted a system that had already been designed, developed, and tested with principal components in production. The offerors were required to

demonstrate the system and propose a contractor plan for training (operator and maintenance), materiel fielding, maintenance, and a schedule of spares for the life of the program on a firm fixed price basis. The contractor was also required to support performance warranties and control of the configuration management plan.

Proposals from two contractors, GTE and Rockwell/Collins, were received in October 1984. Both of the companies utilized allied nation technologies as the basis for their proposals. Rockwell/Collins worked with the British firm, Plessy, which produced the Ptarmigan system. GTE worked with the French firm, Thomson, which manufactured the RITA system. [Ref. 20: p.1067] Both contractors demonstrated their systems in a tactical environment with production type equipment. During the demonstration, Army evaluators and officials from other government agencies were able to use the terminal equipment as well as observe the network. Each proposal was evaluated in five major categories; operational suitability, life-cycle cost considerations, technical, logistics, and management. [Ref. 21: p. 3] In December 1985, after lengthy negotiations, the contract was awarded to GTE Government Systems Corporation, Taunton, Massachusetts.

Three contracts were developed for the MSE system. The first contract included six one-year production options and stipulated that GTE provide the hardware, technical data, and initial spares. This contract also required that GTE perform the tasks associated with fielding the system. The second contract required that GTE provide follow-on replenishment spares for MSE nonstandard items, contractor maintenance support, equipment training, installation kits, and technical assistance for up to 22 years (15 years following last production deliveries). [Ref. 22: p. H-2] The third contract required post

deployment software support, to include software enhancements, production, and distribution after the system warranty expires.

F. CHAPTER SUMMARY

This chapter described the MSE system and acquisition history. The acquisition strategy and contracts outlined in this chapter provide the background for understanding MSE requirements for materiel fielding.

V. MOBILE SUBSCRIBER EQUIPMENT MATERIEL FIELDING

A. INTRODUCTION

This chapter begins with a description of the materiel fielding concept for the MSE program. The fielding concept was incorporated into the MSE acquisition contracts. As a result, key materiel fielding elements - TPF, NET, and logistics support - were accomplished by the contractor. Contractor requirements were designed to ensure that the total system was available for fielding and to ensure that the fielded equipment was fully operational and logistically supportable immediately upon receipt of the system by gaining units. This chapter will describe how the nontraditional contractor requirements were accomplished and examine how these services helped to overcome the challenges of fielding NDI systems.

B. MATERIEL FIELDING CONCEPT

Army leadership directed that the MSE materiel fielding concept be developed and briefed to gaining commands in order to integrate their comments into contractor negotiations prior to the award of contracts. The fielding concept was based on minimizing the impact on unit readiness and ensuring continuous connectivity of communications, command, and control. The resulting concept required that MSE be fielded to the total Army, both active and reserve, and the fielding occur one corps at a

time, one corps per year. The system was fielded under the total package concept in accordance with Army policy.

C. TOTAL PACKAGE FIELDING

The contractor was required to provide TPF, delivering a complete system to the gaining unit. When the contractor delivered the system, it also included everything that supported that system to include the vehicles, trailers, shelters, generators, and tools. The contractor accomplished TPF through the management of thirty sub-contractors, which included both U.S. and foreign manufacturers. [Ref. 19: p. 14]

In order to provide for the necessary coordination and planning, the contractor conducted site visits, formally scheduled at eighteen, twelve, and six month intervals prior to the start of MSE fielding phase. [Ref. 23: p. 1-3] The site visits were conducted in coordination with the PM-MSE and the gaining unit. The site visits enabled the contractor to develop the MFP through input provided by the gaining unit and the PM-MSE. The contractor was able to perform site surveys to establish temporary materiel fielding and training facilities. The temporary facilities were established within the immediate vicinity of each gaining unit to facilitate access by units and minimize the impact on the unit's operational readiness.

The marshalling of the total package was accomplished at the contractor's plant and was designed to enable the contractor to gather the MSE elements at one location so that they could be assembled before being issued to the gaining unit. This equipment was organized under a coherent unit set (CUS) methodology. A CUS refers to the total MSE

that a given unit received. The delivery of the CUS included 100% of the equipment required to support the MSE communications system. The CUS was inspected and inventoried for completeness prior to delivery to the fielding site.

The fielding of equipment began on the required delivery date. Government acceptance of contractor efforts required that 100% of authorized MSE equipment be on hand. [Ref. 24] The contractor effected the transfer of equipment to each gaining unit and user organization through the contractor materiel fielding team, which was responsible for processing the equipment. Equipment processing consisted of unpacking, assembling components and assemblages, and servicing of vehicles and power units. Equipment processing was followed by the Fielding Site Acceptance Test (FSAT). The FSAT consisted of visual and mechanical inspection, and included operational and functional tests. The FSAT was conducted by the contractor and witnessed for compliance by government representatives which included the gaining unit, Army Materiel Command, and the Defense Contract Administration Service representatives. [Ref. 23: p. 3-11] The purpose of FSAT was to ensure the MSE equipment was physically on hand and operational, and to demonstrate the functional performance of the system.

As discussed in Chapter III, the Army normally assumes the responsibility for total package fielding. The materiel developer coordinates system requirements through several contractors and buying commands, procuring many of the items for a major system separately. The Army supplies the items as GFE for integration into the end item or for direct issue to the unit.

MSE represented a departure from this practice by requiring the contractor to procure the components, even standard Army items, directly from the manufacturer. Thus, even though the MSE shelter carrier, the M-1037, was a standard Army vehicle, the contractor bought it directly from the manufacturer, AM General. [Ref. 16: p. 12] By making the contractor responsible for the M-1037 and everything else required for MSE operation, the government avoided potential technical and schedule problems that often accompany the use of GFE. [Ref. 25: p. 51]

TPF by the contractor reduces the technical risk for the integrated system's performance. The contractor assumes the risks associated with the acquisition and integration of the entire system. Generally, contractors in private industry have greater leeway to assist subcontractors to ensure technical performance of components produced by subcontractors. If the component design needs modification for integration or defective components are provided, the contractor is able to resolve these problems quicker than the government because the contractor is not encumbered by the same kind of regulations placed upon government contracting and technical personnel.

TPF by the contractor reduces the schedule risk associated with GFE. Priorities for GFE may be controlled by the DAMPL and may not support the NDI acquisition schedule. Since the contractor is not bound by the DAMPL priorities, issues involving the allocation of resources through the buying commands are avoided.

Placing the emphasis on meeting schedule and quality requirements through TPF by the contractor reduces the potential for cost growth. Schedule and performance problems have a direct effect on the program's overall cost. Schedule and performance

problems could easily translate into significant program cost increases, offsetting savings which are achieved by NDI acquisition.

TPF by the contractor recognized the need to field MSE with minimal disruption and minimal adverse impact on unit readiness which could result if all elements of the system were not deployed simultaneously. Given the Army's priority distribution system, some units within a corps were likely to have older equipment long after others in the same corps were fielded. TPF by the contractor ensured interoperability, enabling the contractor to field all the equipment of a corps area network, one corps at a time.

Making the contractor responsible for all elements that made up the system may have initially increased costs to the government. The government could possibly provide equipment less expensively than the contractor through the purchase of items in larger quantities when combined with other government requirements. In addition, the primary contractor's costs for managing the acquisition of the components and integration of components are increased. These additional costs are applied in the form of profit, general and administrative expenses, and material overhead.

TPF by the contractor may not provide relief from the difficulties of acquiring items identified as shortage within the Army. With few exceptions all components of the MSE system were available for fielding. [Ref. 26] One exception throughout the materiel fielding of MSE was a tester for a communications security device. This device was a shortage item throughout the Army prior to MSE fielding. The Army controlled the production line and was fielding it to units according to the DAMPL. This prevented the contractor from acquiring the required amount. The contractor was limited to procuring

and fielding two out of three devices required for each signal battalion until adjustments were made in the production rate. [Ref. 26]

D. NEW EQUIPMENT TRAINING

Signal unit training was conducted by members of the contractor's NETT. A training suite of equipment was assembled from the CUS to make up the unit training set. The contractor equipped and operated the fielding and training facilities in the vicinity of each gaining unit. The contractor training program was designed to give Army personnel the incremental knowledge and skills required to both operate and maintain the system. The training was divided up into three distinct phases: individual, network, and collective training.

1. Individual Training

Equipment training for MSE consisted of the contractor providing training for supervisors and operators in a classroom environment. Training was conducted over three shifts of eight hours each, for five continuous days for each week of training. Classes included system fundamentals, set-up and tear down, network management, and equipment operation. After classroom instruction, the contractor provided hands-on training with the equipment provided in the training suite. After the training was completed, the training equipment was restored where required and returned to the unit as part of the unit's operational system.

2. Network Training

Upon completion of individual classroom training, network training was conducted. Network training consisted of supervisor, crew, and network management training. This provided intensive training in a complete network. The crews trained on the actual equipment that had been designated for issue to them. [Ref. 27: p. 7]

3. Collective Training

Collective training consisted of a field training exercise (FTX) and command post exercise (CPX). The CPX/FTX were designed to support the MSE fielding plan and the unit training requirements. These training exercises also assisted the commanders in evaluating their unit training readiness in accordance with specific acceptance criteria. This training was a 14 day communications exercise. The first phase was a Battalion FTX. The signal elements deployed, gaining experience in network management and system movement. The objectives of this phase were to set up the command posts and to develop the unit signal skills with MSE troubleshooting. The second phase was the CPX. All signal units and subscriber terminal devices were employed, requiring units to establish and maintain required communications.

Immediately after the FTX/CPX a formal critique was held with the gaining unit, PM-MSE, and the contractor. Identification of the immediate corrective actions resulting from the exercise was jointly accomplished. The contractor then restored the MSE system to a fully operational condition and replenished all assets that had been used from the PLL/ASL. The equipment was inventoried for completeness and transferred to

the unit. The gaining unit commander accepted the MSE system by signing the required documentation for inspection and acceptance, identifying the unit as having reached IOC.

Government acceptance for the contractor effort was acknowledged using the following criteria: the contractor restored the MSE equipment and restored the PLL/ASL to 100%; all MSE and support equipment was available and operational; personnel training was complete; and unit proficiency had been satisfactorily demonstrated. [Ref. 28: p. 13]

The use of a contractor training program enabled Army to avoid the significant challenge of training support development resulting from the accelerated acquisition of MSE. The MSE training effort reclassified over 15,000 soldiers. [Ref. 29: p. 3] This effort was organized to minimize the readiness impact through the development of a home station training capability to convert 48 signal battalions worldwide. [Ref. 28: p. 2] This effort would have required a substantial commitment of military personnel with the capability to train not only system doctrine and tactics but also system technical tasks such as system operation and maintenance. The Army did not have the capability to train personnel in sufficient time and quantity to respond to meet the intense fielding schedule.

The use of contractor training capabilities took advantage of the technical competence of the contractor. A key relationship exists between the development of technical drawings, technical manuals, and training materials. These materiels are built upon each other, and changes in one generally affect the others. The contractor had already developed the technical drawings and technical manuals. The contractor easily

built a training capability in a much shorter period by bringing these elements together early in a cohesive fashion. The contractor accomplished the development of these elements in an integrated effort, reducing the time it would have taken if these events had been accomplished serially as in the usual NET development process.

A final advantage was that the contractor could be held accountable for the training product that was delivered. The contractor training program for the first units fielded was determined inadequate and resulted in several iterations of changes. Based on the changes the contractor was required to provide additional instructor teams to adjust the training schedule. [Ref. 30] These changes resulted in a request for economic adjustment claim from the contractor at the conclusion of the fielding process. The government could have avoided this claim by contracting for training requirements to produce a level of soldier and crew competence rather than contracting for specific courses and hours of classroom instruction.

E. LOGISTICS SUPPORT

In order to understand the MSE the requirements for logistics support, a brief description of the total system is necessary. MSE is a hybrid system that includes nonstandard items (items not already in the Army inventory), and standard items (items already in the Army inventory). Logistics support for standard items is accomplished through established Army procedures. Logistics support for nonstandard items is provided by the contractor. Contractor responsibilities include long term supply support and long term maintenance support.

1. Maintenance

The MSE system maintenance concept for nonstandard equipment is based on the levels of Army maintenance: organizational, IDS, IGS, and depot. Signal units perform organizational and IDS level maintenance for MSE nonstandard equipment. The IGS and depot functions for nonstandard equipment are performed by the contractor at regional support centers (RSC). Five RSCs are geographically positioned to support active Army corps as seen in Figure 5. The contractor capabilities at the RSC include test, fault isolation, and repair of nonstandard equipment. The RSCs also collect maintenance data and report on nonstandard items. The contractor provides these services for the life of the MSE system, which is defined as 15 years after acceptance of the last MSE hardware item or 22 years from the contract award. [Ref. 22: p. H-6]

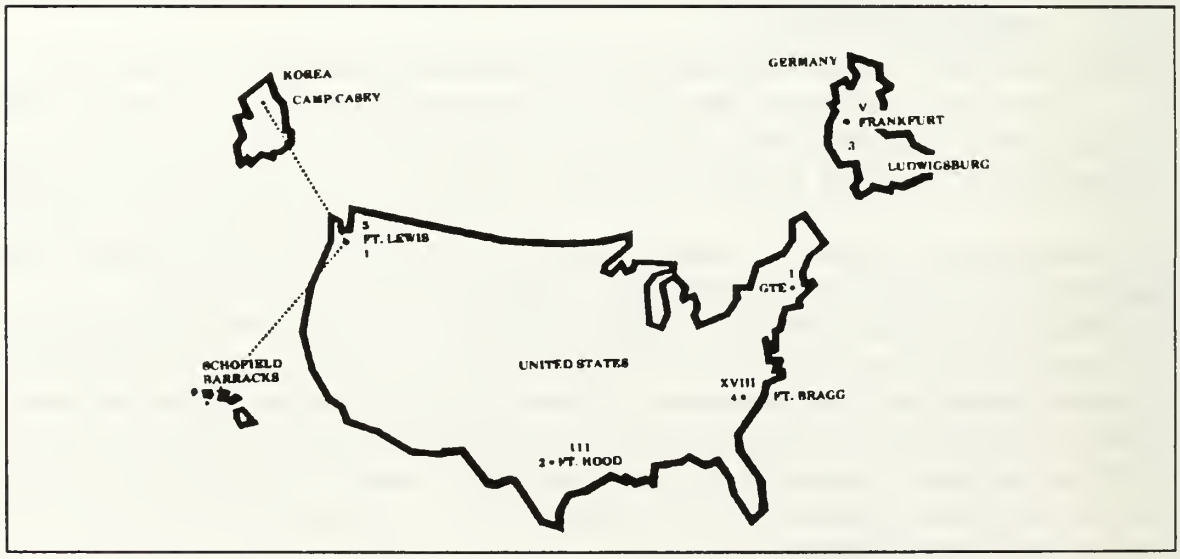

Figure 5. Deployment of Regional Support Centers [Ref. 29: p.77]

2. Supply Support

For Army standard equipment the initial ASL/PLL is provided by the contractor. The existing Army logistics system is in place to handle the replenishment of these items. Reprocurement technical data is available, and the Army can obtain replenishment items and maintenance under normal procedures. For nonstandard equipment, supply support is provided by the contractor. Requisitions use normal Army supply procedures through the IDS level to the Materiel Management Center (MMC). Requisitions passed to the MMC are sent through normal channels to the National Inventory Control Point (NICP). The NICP forwards requisitions to the contractor. The contractor serves as the wholesale level supply for MSE nonstandard items. The contractor manages the inventory of this equipment. The contractor requirement for spares and repair parts is in effect until fifteen years after the fielding of the last MSE system.

The contractor was also required to provide interim as well as long term technical assistance. Interim technical assistance consisted of personnel at the unit and IDS level for up to twelve months starting with network training during the fielding phase. [Ref. 23: p. 3-4] Responsibilities included continued training support, repairs as required, and repair parts support. The interim support included six technical representatives in support of all equipment for 90 days, and two technical representatives in support of communications equipment for the remainder of the 12 months. [Ref. 23: p. 3-4]

Long term technical assistance is provided in support of MSE nonstandard system communications equipment only. The contractor personnel, based at the RSC, provide assistance in the field to resolve system problems beyond the capabilities of unit and IDS personnel and to diagnose chronic failures.

Contractor system maintenance and supply support emphasized the use of three key precepts: sustained high system availability beginning at initial fielding, maximum use of the existing Army logistics system; and a contractor-Army interface transparent to MSE users. [Ref. 23: p. B-1] This approach by the contractor resulted in a smooth transition and ease of continued support for the gaining units. The contractor interim and long term technical assistance are designed to ensure the continued enhancement of the Army's combat readiness.

In order to overcome the challenges associated with maintenance and supply support resulting from the accelerated schedule of NDI acquisition, the government increased the support requirements normally required from the contractor. Since the contractor capability for supply support and maintenance already existed, contractor support provided a simple and responsive solution for maintenance and supply support concerns.

The use of contractor support avoided the costs for levels of technical data considered proprietary. Contractor support also avoided start up costs for the development and staffing of repair and maintenance functions in support of IGS and depot functions.

By structuring the contract to require services for the life of the system, the acquisition of MSE overcame many of the negative implications associated with contractor support. Contracting services for the life of the system avoided concerns of contractor availability and provided protection against excessive growth in the cost of spares and maintenance. It also precluded the usual practice of periodically soliciting new support contracts, which may disrupt support services.

An indication of the success of the contractor's logistical support efforts can be identified through Unit Status Report (USR) data. USR data identify readiness rates which have been collected on MSE equipment from the first unit fielded. Readiness rates reflect the status of the unit's MSE resources measured against the resources required to undertake the wartime mission for which the unit is organized. Beginning with the first unit, readiness rates for the MSE equipment have exceeded the Army's goal, maintaining a historical average of 96%. [Ref. 31]

There has always been a perception that systems with contractor logistics support will not be properly supported in wartime. [Ref. 16: p. 30] The Army by law cannot compel civilians to remain in theater during war. [Ref. 16: p. 34] In order to clarify the contractor's wartime responsibility, a war clause was provided as an amendment to the MSE contracts. During the war in Southwest Asia, not only was the system adequately supported by contractor civilians, but these civilians were co-located with the forward elements. [Ref. 32: p. 28] The Regional Support Center in Southwest Asia was rapidly deployed by the contractor and was identified as an invaluable asset towards maintaining the system. [Ref. 29: p. 68]

Sustainment functions provided by the contractor may meet military support requirements. This does however require tradeoffs. [Ref. 33] The Army may be required to deploy to any location in the world on short notice. Costs are increased as the Army deploys not only its support elements but also those of the contractors performing sustainment functions. In addition, the government pays a premium for contractor services under extreme conditions to ensure compensation consistent with the degree of risk involved.

Dedicated spare support for the operational life of the system provides for ease of operation and an uninterrupted source of parts. Dedicated spare support, however, presents unique challenges in determining costs for future years. Future costs are estimated based on expected rates of inflation, costs of materials, and costs of labor. With an established fixed price contract, both the contractor and the government are at risk when these costs do not conform to projections.

Dedicated logistics support for the operational life of the system does not provide a mechanism for competition to ensure the contractor operates with maximum efficiency. The contractor has less incentive to reduce costs given the sole-source environment.

F. CHAPTER SUMMARY

The contractor support for the materiel fielding of MSE was designed to minimize the impact on unit readiness through complete integration of the fielding, training, and

sustainment functions. These efforts enabled the materiel fielder to address the challenges associated with the accelerated acquisition cycle of NDI systems.

VI. SUMMARY AND LESSONS LEARNED

A. SUMMARY

This study described the framework of the DoD acquisition process and how this process serves to procure weapons systems to achieve the operational goals of the Armed Services. This study identified the use of NDI systems in the acquisition of major systems and outlined the benefits and challenges associated with NDI acquisition.

The acquisition of NDI systems provides a quick response to user needs, but also presents many unique challenges for materiel fielding. Many of the standard fielding practices do not support the materiel fielding requirements when the acquisition process is accelerated. Under the NDI acquisition strategy, the time available to accomplish the activities required for materiel fielding is greatly reduced. In many cases innovative or nontraditional methods must be developed to support NDI procurement.

This thesis examined the nontraditional methods of materiel fielding which were employed to address the challenges posed by the NDI acquisition of MSE. Nontraditional methods included contractor total package fielding, contractor developed and implemented training, and contractor logistics support. The requirements for contractor support for the materiel fielding of MSE minimized the impact on unit readiness through the integration of the equipment fielding, training, and sustainment functions. These efforts enabled the materiel developer to minimize the risk posed by the challenges associated with the accelerated acquisition process of NDI systems.

B. LESSONS LEARNED

This thesis identifies the challenges associated with the materiel fielding of NDI systems. For NDI systems the leadtime available to accomplish the activities critical to materiel fielding - TPF, NET, and logistics support - are significantly reduced. As a result, alternative ways of accomplishing these activities must be identified. This thesis examines the nontraditional methods used in the MSE program to address these challenges. The strengths and weaknesses of these methods provides lessons learned for future NDI programs.

TPF by the contractor is a viable and responsive alternative to provide a consolidated support package of equipment and materiel for the gaining command. TPF by the contractor reduces the technical risk for the integrated system's performance and reduces the potential schedule risks associated with GFE. TPF by the contractor places the emphasis on meeting schedule and quality requirements and reduces the potential for cost growth. This alternative reduces the disruption of and adverse impacts on unit readiness which could result if all elements of the system are not deployed simultaneously. A disadvantage of this alternative is increased system costs. Also, this alternative may not provide relief from the difficulties of acquiring shortage items.

New equipment training by the contractor is a feasible alternative to the development of NET within the Army. Contractor training takes advantage of several key contractor strengths. A tight relationship exists between the development of technical drawings, technical manuals, and training materials. The contractor has the most

comprehensive technical knowledge of the system early in the program, and has the capability to bring these elements together in a cohesive fashion. The contractor can accomplish these elements as an integrated effort, reducing the time it would take if these events were accomplished serially. A disadvantage of contractor training involves defining the contract requirements for training. Flexibility must be built into the contract requirements to ensure that the results of the contractor training effort achieve the desired effect. It may be necessary to identify a level of operational competence as opposed to only defining numbers and hours of classroom instruction.

Dedicated contractor spare support for the life of the system is a viable alternative to reduce difficulties associated with limited technical data. This alternative may reduce the costs associated with the procurement of technical data. By structuring the contract for the life of the system, protection is provided against excessive growth in the cost of spares. This alternative reduces the potential for breaks in supply support resulting from reprocurement actions. Disadvantages of this alternative are lack of incentive for the contractor to cut costs, and the difficulty of accurately predicting future costs of materiel and support.

Contractor maintenance for nonstandard items is a viable alternative to the development of a maintenance capability within the Army. Contractor maintenance provides a quick solution when time required to develop the capability within the Army does not support the requirements for fielding. This alternative reduces the cost associated with the investment in facilities and equipment necessary for repair. Contractor maintenance provides the sustainment support when technical data is not available for

purchase or is only available at a substantial cost. A disadvantage of this alternative is the government will pay a premium for services required during periods of crisis.

C. RECOMMENDATIONS FOR FURTHER STUDY

The federal government and the DoD emphasize the need for a shift toward commercial product acquisition to reduce the cost of developing products and reduce the duplication of existing commercial capabilities. As a result the services are employing more NDI systems and components. Since NDI acquisition reduces the leadtime available to accomplish the activities critical to materiel fielding, alternative methods of accomplishing these activities are developed. Current acquisition support methods must be examined to determine what areas create barriers to the successful accomplishment of NDI acquisition programs. The following issues are raised and are recommended for further study:

1. What are the critical aspects for materiel fielding that are common to NDI programs? As alternative methods are developed to accomplish materiel fielding of NDI systems, how can these methods be evaluated and used to update and improve fielding policy and regulatory guidance?

2. What criteria are used in the selection of alternative methods to support NDI fielding? How can a decision model be developed to assist acquisition personnel in making these decisions?

3. How can internal Department of the Army support processes be changed to support accelerated acquisition? Internal support processes require an extensive amount of planning, are labor intensive, and create many impediments for NDI systems.

4. What are the implications for the current depot maintenance support structure as the use of NDI acquisition increases and alternatives for establishing and servicing

equipment to meet the accelerated acquisition process are developed? Can the depot support capability be reorganized to achieve greater flexibility and become more responsive to NDI acquisition?

APPENDIX A LIST OF ACRONYMS

ASL	Authorized Stockage List
BOIP	Basis Of Issue Plan
CECOM	Communications/Electronics Command
CPX	Command Post Exercise
CUS	Coherent Unit Set
DAMPL	Department of the Army Master Priority List
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
FSAT	Fielding Site Acceptance Test
FTX	Field Training Exercise
FUE	First Unit Equipped
GFE	Government Furnished Equipment
IDS	Intermediate Direct Support
IGS	Intermediate General Support
IKPT	Instructor and Key Personnel Training
ILS	Integrated Logistics Support
IOC	Initial Operational Capability
MFA	Materiel Fielding Agreement
MFP	Materiel Fielding Plan
MICOM	Missile Command
MMC	Materiel Management Center
MNS	Mission Need Statement
MSE	Mobile Subscriber Equipment
NDI	Nondevelopmental Item
NET	New Equipment Training
NETT	New Equipment Training Team
NICP	National Inventory Control Point
NMIBT	New Materiel Information Briefing Team

OMB	Office of Management and Budget
ORD	Operational Requirements Document
PLL	Prescribed Load List
QQPRI	Qualitative and Quantitative Personnel Requirements Information
RFP	Request for Proposal
RSC	Regional Support Center
STRAP	System Training Plan
TPF	Total Package Fielding
TRADOC	Training and Doctrine Command
Tri-Tac	Tri-Service Tactical Communications
USR	Unit Status Report

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